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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/677,869
Filing Date: October 02, 2003
Appellant(s): FULLER ET AL.

Randy Shoemaker
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed November 7, 2005, and the supplemental to the appeal filed December 20, 2005, appealing from the Office action mailed June 8, 2005.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is incorrect. A correct statement of the status of the claims is as follows:

This appeal involves claims 1-4, 6-8, 10-12 and 14-16.

Claims 1 and 10 have been amended subsequent to the final rejection.

Claims 9 and 17 have been canceled.

Claims 5 and 13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. (The rejection of claims 5 and 13 has been withdrawn as discussed in the **Grounds of Rejection to be Reviewed on Appeal** below).

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is substantially correct. The changes are as follows: Claims 5 and 13 were rejected under 35 USC 103 based on Fuller et al in view of the admitted state of the prior art.

WITHDRAWN REJECTIONS

The following grounds of rejection are not presented for review on appeal because they have been withdrawn by the examiner.

(1) the rejection of claims 3 and 12 under 35 USC 103 as being obvious over Fuller et al (US 6743468)

(2) the rejection of claims 5 and 13 under 35 USC 103 as being obvious over Fuller et al in view of the admitted state of the prior art.

(3) the rejection of claims 8 and 16 under 35 USC 103 as being obvious over Fuller et al in view of Van Steenkiste et al (US 6139913).

All three of these rejections have been removed due to the statement contained in the "Supplemental to Brief on Appeal" filed Dec. 20, 2005, which provides a signed statement from the attorney of record, Scott McBain, that the subject matter of Fuller et al and the present claimed invention were at the time the presently claimed invention was made, owned by the same person or subject to an obligation of assignment to the same person. This removes Fuller et al as a reference in these 35 USC 103 rejections.

As a result, no rejection remains against dependent claims 5 and 13, and therefore, claims 5 and 13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

6,743,468	FULLER et al	6-2004
2002/0110682	BROGAN	8-2002

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1, 2, 4, 6, 7, 10, 11, 14 and 15 stand finally rejected under 35 U.S.C. 102(e) as being anticipated by Fuller et al (US 6743468).

The applied reference has a common inventor (Brian K. Fuller) with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Claim 1: Fuller teaches a method of repairing a defect in a kinetically sprayed surface. *Column 7, lines 35-65.* A kinetically sprayed surface having a defect in the surface is provided. *Column 7, lines 55-60.* The defect can be caused by kinetic spraying. *Column 7, lines 35-45 and 55-60.* A repair coating is applied to the defect by thermally spraying a molten material on the defect. *Column 7, lines 5-15 and 55-65.* This thermal spray coating fills and repairs the defect. *Column 7, lines 55-60.* The thermal spray process can be an air plasma thermal spray process. *Column 6, lines 5-15 and column 7, lines 25-35 (as the "air heater 32" can comprise a "plasma thermal heater", the provided thermal spray process will be an "air plasma thermal spray process").* The thermal spray process can also be a high velocity oxy-fuel combustion thermal spray process as claimed, because the heater can also be a "combustion chamber", which in combination with the provided de Laval supersonic nozzle would provide the required structure for a high velocity oxy-fuel combustion thermal spray process. *Column 7, lines 25-27 (the "combustion chamber" and column 4, lines 5-10 (as to the de Laval supersonic nozzle).*

Claim 2, 11: the molten material is formed from the same material as the kinetically sprayed surface. *Column 7, lines 35-65 (as the gun is just oscillated from one spray type to the other).*

Claim 4, 10: an additional kinetically sprayed coating can be applied over the thermally sprayed once molten material. *Column 7, lines 55-65.*

Claim 6, 14: the defect can comprise at least one conical defect. *Column 7, lines 49-45.*

Claim 7, 15: the molten material can be a metal or alloy. *Column 6, line 60 through column 7, line 5.*

Claims 1-4, 6-8, 10-12 and 14-16 stand finally rejected under 35 U.S.C. 103(a) as being unpatentable over Brogan (US 2002/0110682).

Claim 1: Brogan teaches a method of repairing a defect in a surface which can be a kinetically sprayed surface. *Paragraphs [0029] and [0069] – [0070].* A possibly kinetically sprayed surface having a defect in the surface is provided. *Paragraphs [0029] and [0069] – [0070] (the initial surface can be applied by kinetic spraying (cold gas dynamic spraying is another term for kinetic spraying – note paragraph [0003] of the present specification)).* A repair coating is applied to the defect by a process that can be thermally spraying a molten material on the defect. *Paragraphs [0029] – [0030] and [0069] – [0070] (the repair coating can be applied by a thermal spraying process such as plasma* *spraying or flame spraying which would melt the particles).* This thermal spray coating fills and repairs the defect. *Paragraphs [0029] and [0069] – [0070].* The thermal spray process can include a flame spray process, high velocity oxy fuel spraying process, etc. *Paragraph [0029].*

Claims 2, 11: the molten material is formed from the same material as the kinetically sprayed surface. *Paragraphs [0069] – [0070] (since the surface is restored).*

Claims 7, 8, 15, 16: the molten material can contain, and thus comprise, a metal, copper. *Paragraph [0051] (copper can be in the coating).*

Brogan teaches all the features of these claims except (1) the use of different material than that kinetically sprayed for the molten material (claims 3, 12), (2) the additional kinetically sprayed coating (claims 4, 10, 11, 15-17), (3) the conical defect (claims 6, 14), and (4) that the defects were caused by the kinetic spraying (claims 1, 10).

However, Brogan does teach repairing a defect in a surface which can be a kinetically sprayed surface. *Paragraphs [0029] and [0069] – [0070].*

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Brogan to use (1) different molten materials for repair with an expectation of desirable coating results, because Brogan teaches that a polymer/aggregate mixture is sprayed to repair the coating, and Brogan teaches a variety of such materials that can be used for different needs *(see paragraphs [0008], [0044] – [0057]*), and thus one of ordinary skill in the art would be suggested to perform routine experimentation to optimize the materials used from the selection given. (2) It would further have been obvious to modify Brogan to further apply an additional kinetically sprayed coating over the thermal spray coating to provide further repair of the coating, because the thermal spray coating would, in time, need to be repaired again after the first repair, due to reuse and rewear occurring as occurs with the initial coating to be repaired, and since Brogan teaches a repair method, one of ordinary skill in the art would be suggested to use the repair method of Brogan again, and Brogan teaches that one of the methods that can be used for repair is kinetic spraying. (3), (4) It would further have been obvious to modify Brogan to repair a conical defect or other defect caused by the kinetic spraying process itself with an expectation of providing a desirably repaired coating, because Brogan teaches to repair a worn down and defective coating in general by recoating where the defects are caused by impact, wear or abrasion processes by remelting and thermally spraying coating that coalesces with the old coating and conical defects or other kinetic spraying defects in the coating would be obviously corrected by the same process, because the remelting and thermal spraying process described would repair any defect that requires newly applied coating, including conical or other kinetic spraying defects.

(10) Response to Argument

Issue A: Rejection of claims 1, 2, 4, 6, 7, 10, 11, 14 and 15 under 35 USC 102(e) based on Fuller et al.

Appellant's Arguments

Appellant argues that independent claim 1 now requires the thermal spray process to be provided by high velocity oxy-fuel combustion thermal spray process, a wire arc thermal spray process, a vacuum plasma thermal spray process, a flame spray thermal process, or a radio frequency plasma thermal spray process. Appellant further argues that all of these listed thermal spray processes require specific thermal spraying equipment not disclosed by Fuller. Appellant argues that while the Examiner indicates that Fuller could be used as a high velocity oxy-fuel (HVOF) combustion thermal spray system, a review of attached Exhibit A, showing the equipment and designs for such HVOF equipment, indicates that none of the systems in Fuller is capable of HVOF spraying. Appellant further notes that the Examiner cited Browning (US 5330798) in the Advisory Action as indicating that Fuller could be used to provide an HVOF combustion thermal spray process. Appellant argues that this is incorrect, because (1) it is irrelevant what an additional reference discloses because the rejection is under 102(e) and requires utilization of a single reference. (2) A review of Browning discloses that it is not a thermal spray process, but rather a kinetic spray system, as Browning teaches to lower the jet temperature to below the melting point of the material being sprayed such that the material is solid prior to impact on a substrate or workpiece, and not an HVOF process that deposits a molten material onto the defect as required by independent claim 1. As to independent claim 10, appellant argues that this claim includes all the limitations of claim 1 plus additional limitations, and thus the use of Fuller is improper for the reasons stated above with respect to claim 1.

The Examiner's Response

The Examiner has reviewed appellant's arguments, however, it remains her position that the features of the rejected claims are taught by Fuller. It is the Examiner's position that the thermal spray operation of the spray apparatus taught by Fuller is inclusive of a high velocity oxy-fuel combustion thermal spray process due to the teaching of Fuller of the use of chamber 32 as a combustion chamber (which would operate off of oxygen (from the air) and fuel (to provide the combustion)) in combination with the de Laval nozzle which provides supersonic (high velocity spray), thus giving a high velocity oxy-fuel combustion thermal spray to the extent required by the claims. See column 7, lines 25-35 column 4, lines 5-40 and figure 2. Appellant's own Exhibit A would agree with this. Note the figure shown on page 25, indicating the need for a combustion chamber and nozzle and powder injector (all shown by Fuller, Figure 2). As to the use of a cooling system and control system for the gases and powders, Fuller teaches to control the system with computer control in the thermal spray mode to maintain the gas temperature as required (column 7, lines 5-15 and also column 3, lines 30-45).

Issue B and C: Rejections of claims 3, 5, 8, 12, 13 and 16 under 35 USC 103 using Fuller alone and in combination with the admitted state of the prior art or Van Steenkiste

These rejections have been withdrawn by the Examiner as discussed in the **Grounds of Rejection to be Reviewed on Appeal** above.

Issue D: Rejection of claims 1-4, 6-8, 10-12 and 14-16 under 35 USC 103 based on Brogan

Appellant's Arguments

Appellant argues that while the Examiner takes the position that Brogan teaches the possibility of a kinetically sprayed surface, due to Brogan suggesting that the term "thermal spraying" encompasses cold gas dynamic spraying, it is the appellant's position that this is an incorrect use of the term. According to appellant there is a clear difference between cold gas dynamic spraying and thermal spraying, as thermal spraying always involves and is defined in the present specification as involving thermal softening of the materials being sprayed such that they are reduced to a molten state prior to their application to a surface. According to appellant, cold gas dynamic spraying, which is equivalent to kinetic spraying, always means that there is no thermal softening of the particles being sprayed and that they strike a surface to be coated in the same physical state as they began. Appellant cites paragraph [0030] of Brogan as clearly providing that Brogan is not disclosing a kinetic spraying process. Appellant further argues that with regard to paragraphs [0069] – [0070] of Brogan, this also does not disclose a kinetically sprayed surface, as Brogan discusses heating a surface to melt the existing covering and then thermally spraying onto that covering, which is unlike the present invention. Brogan is disclosing repair of worn and damaged surfaces using a thermal spray comprising a polymer and an aggregate, which is unlike the invention as claimed in claim 1, as the kinetically sprayed surface with a defect therein caused by the kinetic spray process and repair of this defect utilizing a thermal spray process selected from the specific group of thermal spray processes is required by independent claim 1. As to independent claim 10, appellant argues that this claim includes all the limitations of claim 1 plus the additional limitation of providing an additional kinetically sprayed coating over the repaired defect, and thus the use of Brogan is not suggested as it does not disclose a kinetic spray process, as discussed above.

The Examiner's Response

The Examiner has reviewed appellant's arguments, however, it remains her position that the features of the rejected claims are suggested by Brogan. It is the Examiner's position that Brogan teaches that the spray methods of Brogan can encompass either kinetic spraying as claimed or thermal spraying as claimed. While appellant can be his own lexicographer and define "thermal spraying" to require that a thermal softening of the material must occur such that the materials are in a molten state prior to application, that definition only applies to his own application. Brogan is free to define his "thermal spraying" to include kinetic (cold gas dynamic) spraying which sprays particles that are not molten upon application and to also include flame and plasma spraying which would provide molten particles upon application. Brogan certainly does not require his "thermally sprayed" particles to be molten on application.

While particles can be molten, as shown by paragraph [0030] where Brogan teaches that the thermal spraying process can "include" spraying to provide a kinetic energy that will soften/melt the polymer, all that is absolutely required by "thermal spraying" according to Brogan is shown in paragraph [0029] where Brogan states "As used herein, thermal spraying is defined as a process of transporting a polymer and an aggregate in a gas stream such that the polymer has sufficient thermal and/or kinetic energy such that the polymer undergoes plastic deformation upon impact with a surface and bonds with the impacted surface with the aggregate embedded therein." (emphasis added). This does not require that the particles melt or soften before impact. In fact, as shown by paragraphs [0037] – [0039], while it is desired to thermally spray above Tm (the softening temperature), it is perfectly possible for the polymer to be deposited at a temperature below Tm, and then post heated to provide the coalesced coating desired.

As to paragraphs [0069] and [0070] not disclosing a kinetically sprayed surface, it is the Examiner's position that these paragraphs disclose how a repair process on an applied polymer/aggregate coating can be provided. In paragraph [0070] Brogan also teaches that "The present invention is thus quickly repairable without extensive surface preparation". Thus, it is indicated that polymer/aggregate coatings applied by the taught method including the kinetic (cold gas dynamic spraying) of paragraph [0029] (that is the present invention) can be repaired by the thermal spraying method, as well. As to the cause of the defects, Brogan teaches a process for repairing a surface with defects. While Brogan describes the defects as occurring after the coating through wear, it would have been obvious to one of ordinary skill in the art to modify Brogan to repair a conical defect or other defect caused by the kinetic spraying process itself with an expectation of providing a desirably repaired coating, because Brogan teaches to repair a worn down and defective coating in general by recoating where the defects are caused by impact, wear or abrasion processes by remelting and thermally spraying coating that coalesces with the old coating and conical defects or other kinetic spraying defects in the coating would be obviously corrected by the same process, because the remelting and thermal spraying process described would repair any defect that requires newly applied coating, including conical or other kinetic spraying defects. As to the further application of an overcoating of kinetically sprayed coating as in claim 10, it would further have been obvious to modify Brogan to further apply an additional kinetically sprayed coating over the thermal spray coating to provide further repair of the coating, because the thermal spray coating would, in time, need to be repaired again after the first repair, due to reuse and rewear occurring as occurs with the initial coating to be repaired, and since Brogan teaches a repair method, one of ordinary skill in the art would be suggested to use the repair method of Brogan again, and Brogan teaches that one of the methods that can be used for repair is kinetic spraying.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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